

LIMNOMETRA SPINOSA, NEW SPECIES (HETEROPTERA: GERRIDAE), A RARE WATER STRIDER FROM INDONESIA AND MALAYSIA

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ABSTRACT. - *Limnometra spinosa*, a new species from the Malay Peninsula, Sumatra, Java, and Borneo, is described. It has previously been confused with the closely related and allopatric species *Limnometra femorata* Mayr, 1865, which occurs mainly in the Philippine Islands.

KEY WORDS. - Heteroptera, Gerridae, *Limnometra*, new species, Malaysia, Indonesia.

INTRODUCTION

In its present sense, *Limnometra* Mayr, 1865, is restricted to the Oriental, Malesian and Australian Realms. The species taxonomy of this large gerrine genus is now rather well known (Hungerford & Matsuda, 1958; Nieser & Chen, 1992; Andersen, 1995; Andersen & Weir, 1997; Polhemus & Polhemus 1998; Zettel & Chen, 2000). Most species are abundant. They live - depending on species - either on the water surface of stagnant waters, or of the most lentic areas of running waters. Their usually large size and beautiful orange or red, black and yellow colour patterns attracted the attention of taxonomists since early times. However, because of the large number of species (presently 29 species described), a large intraspecific variability in size, and the delicacy of diagnostic differences in genitalia and leg structures of the males, some species formerly have been misinterpreted or misidentified (see, e.g., Andersen & Weir, 1997; Zettel & Chen, 2000).

So far *Limnometra femorata* Mayr, 1865, has been the only described species, in which males bear a strong single anteapical spine on the mesofemur (see Fig. 3), lacking only in the smallest specimens (Zettel & Chen, 2000). *Limnometra femorata* has been described from the Philippines (Mayr, 1865), where it is widely distributed but became rare (Zettel & Chen, 2000). The holotype of *L. femorata*, a macropterous male, is deposited in the Natural History Museum Vienna (Zettel & Chen, 2000). *Limnometra femorata* has seemed to be one of a few widely distributed species of *Limnometra*, as it has been further recorded from Japan (Ryu-Kyu), Taiwan, Borneo, Sumatra, and West Malaysia (Hungerford &

Matsuda, 1958; Cheng & Fernando, 1969; Nieser & Chen, 1992; Andersen, 1995). Beside numerous specimens from the Philippines (listed in Zettel & Chen, 2000) the author has studied also specimens from "Banguey" (Banggi Island) north of Borneo, which were collected together with the type of *L. kirkaldyi*, Breddin, 1901; and therefore he can confirm the synonymy of this taxon with *L. femorata* as proposed by Hungerford & Matsuda (1958). The records of *L. femorata* from West Malaysia by Cheng & Fernando (1969) and from Sumatra by Nieser & Chen (1992), however, belong to *L. spinosa*, new species, as recognizable by drawings of colour pattern and endosoma sclerites, respectively.

In the Signoret collection deposited in the Natural History Museum Vienna there are two specimens (one male, one female), which have been collected in "Java" and identified by Signoret as "*spinosa*", a name obviously referring to the mesofemoral spine of the male. "*Limnometra spinosa*" is apparently a collection name, as there is no published description of such a taxon. Both specimens differ from *L. femorata* considerably in colouration. Besides, differences in the endosoma sclerites of the male have been detected. By the courtesy of several curators more material from West Malaysia, Sumatra, and Borneo could be examined, which perfectly agrees with the specimens from Java. There are no specimens with intermediate colour pattern. The new species is described here under the former collection name *L. spinosa*.

The question arises, why a large water strider with striking characters like *L. spinosa*, new species, has remained undescribed for more than one hundred

years. One answer can probably be found in the fact that the male mesofemoral spine has been regarded unique for *L. femorata* (a species also rarely represented in collections), and all specimens with this striking characteristic have been identified as this species without detailed study. On the other hand, *L. spinosa* is rare. The type specimens mostly come from old collections, from the nineteenth century and until 1921, except one specimen collected in West Malaysia in 1973. Also the specimens reported to the author from American collections have been collected between 1899 and 1950 - as far as they are dated. It is assumed that, like the closely related *L. femorata* (Zettel & Chen, 2000), *L. spinosa* inhabits astatic pools in forests and therefore is especially sensitive to habitat destruction by man. This should be confirmed in ecological investigations to pay more attention to the protection of this beautiful and vulnerable species.

MATERIALS AND METHODS

Specimens are deposited in the following collections:

AMNH	American Museum of Natural History, New York, U.S.A.
BMNH	The Natural History Museum, London, United Kingdom [= former British Museum (Natural History)]
CHI	Coll. E. Heiss, Innsbruck, Austria
JTPC	Coll. J.T. Polhemus, Englewood, Colorado, U.S.A.
NHMW	Naturhistorisches Museum Wien, Vienna, Austria
ZMAN	Zoological Museum, University Amsterdam, The Netherlands
ZMHB	Zoological Museum, Humboldt University, Berlin, Germany

Terminology and methods follow Nieser & Chen (1992) and Zettel & Chen (2000). The type material is cited according to the original labels of the mostly old collection specimens. Each single label is marked with “”; the backslash sign \ indicates the brake of a line. As far as more informations can be given, these are added in squared brackets.

TAXONOMY

Differences between *L. femorata* and *L. spinosa*

- Yellow mark on mesacetabula small and ovate, on metacetabula small and roundish; black mesopleural stripe thin (in some specimens strongly reduced) and ventrally sharply limited; yellow mesopleural stripe

posteriorly confluent with ventral yellow area (Fig. 2). Median black line on pronotal lobe (nearly) reaching hind margin. Connexiva orange. Abdominal sternite 2 with median carina nearly reaching base. Forewing dark brownish, costal margin reddish. Male vesicula: lateral sclerite caudally with long hook (Fig. 5).....

L. femorata

Yellow marks on mesacetabula and metacetabula very large and roundish; black mesopleural stripe broad, ventrally faded; yellow mesopleural stripe posteriorly divided from ventral yellow area (Fig. 1). Median black line on pronotal lobe often not reaching hind margin, because in posterior third lacking or faded. Connexiva more or less infuscated. Forewing blackish. Abdominal sternite 2 with median carina in anterior fourth lacking or very blunt. Male vesicula: lateral sclerite caudally more evenly curved (Fig. 4)

L. spinosa, new species

Limnometra spinosa, new species

(Figs. 1, 3, 4)

Limnometra femorata - Cheng & Fernando, 1969: 106-107, 142; Nieser & Chen, 1992: 14, 15; Andersen, 1995: 118 (partim).

Material examined (all specimens macropterous). - Holotype (male) - "Java\ Coll. Signoret", "spinosa\ det. Signoret" (NHMW).

Paratypes - 1 female, same label data as holotype (NHMW); 1 male "10594", "Malaiia.Fischer", "Zoolog.Museum\ BERLIN" (ZMHB); 1 male "Chandenriang\ 29.IX.1973", "Malaya\ G.J.Minet", "? sp.\ Malaysia" (CHI); 1 female "Matang [West Malaysia, Perak] Rd\ 14-4-1911" (BMNH); 1 male "MALAYA\ SELANGOR, F.M.S.\ Gombak Valley\ Oct 18th 1921" (BMNH); female "MALAY PENIN:\ PAHANG, F.M.S.\ Kuala Jahan\ 300\ Nov. 20th 1921" (BMNH); 2 males, 1 female "Barabe\ Z.O.Afd.\ BORNEO. [SE Borneo]\ Geschenk [= "gift"]\ A. POOL 1883.", "Museum Natura\ Artis Magistra", "Tenagogonus (Limnometra)\ femoratus (Mayr)\ Det. N. Moller Andersen" (ZMAN; 1 male NHMW); 1 male "Kuching [Borneo, Sarawak]\ Dec.\ 1909" (BMNH); 1 male "Kuching [Borneo, Sarawak]\ Apr. 28\ 1899" (BMNH); 1 female "Kuching [Borneo, Sarawak]\ Feb. 3\ 1899" (BMNH); 2 males, 4 females "Lawas [Borneo, Sarawak]\ Sept. 9\ 1909" (BMNH, 1 male, 1 female NHMW) (all specimens from BMNH bearing second label "Ex. F. M. S.\ Museum.\ B.M.1955-354"); 2 males, 1 female (4 additional, strongly shriveled males not included in the paratype series) "Coll. Mc Gillavry\ Batang, Serangan\ SUMATRA, 1911\ leg.de Bussy", "coll. Dr. D.\ MacGillavry", "Tenagogonus (Limnometra)\ femoratus (Mayr)\ Det. N. Moller Andersen" (ZMAN; 1 male NHMW); 1 male, 5 females "Coll. Mc Gillavry\ Minahol, O.S. oerbosch\ SUMATRA, 28 V 1917\ leg.J.E.A. den Doop", "coll. Dr. D.\ MacGillavry", "Tenagogonus (Limnometra)\ femoratus (Mayr)\ Det. N. Moller

Andersen" (ZMAN; 1 female NHMW); 4 males, 2 females "J. B. CORPORAAL. Sumatra's O.K. Tandiong Merah. 6. 1919. 22 M", "Tenagogonus (Limnometra) femoratus (Mayr) Det. N. Moller Andersen" (ZMAN; 1 male NHMW); 1 female "J. B. CORPORAAL. Sumatra's O.K. Bobongan 18. 4. 1921", "Tenagogonus (Limnometra) femoratus (Mayr) Det. N. Moller Andersen" (ZMAN).

Additional material (not examined, data forwarded by Dr. John T. Polhemus; all specimens macropterous). 1 male, Indonesia, Sumatra, Dolok Merangir, coll. E. W. Diehl (JTPC); 1 male, Malaysia, Sabah, Kinabatangan Distr., SE of Dewhurst Bay, 14.V.-2.VL1950, CNAM Borneo Zool. Exped. 1950, leg. R.F. Inger & D.D. Davis (JTPC); 1 female, Malaysia, Sarawak, Md. Malang, 2500 ft., coll. Dr. E. Mjoberg, coll. F.M.S. Museums, Brit.Mus. 1934-76 (JTPC); 1 female, Malaysia, Sarawak, Kuching, capt. 25.VII 1899 by Dyak collector, pres. 1900 by R. Shelford (JTPC); 2 females Malaysia, Sarawak, Kuching, AC 3907 (7TPC).

Dimensions (in mm). - Body length (incl. wings) of male 16.6 - 23.0, of female 14.8 - 19.1; head width of male 2.3 - 3.1, of female 2.3 - 2.6; length of first antennal segment of male 3.2 - 5.1, of female 2.9 - 3.5; length of mesofemur of male 15.8 - 24.9, of female 12.8 - 17.3.

Colour. - Ground colour dorsally orange, laterally and ventrally yellowish; head with antennal tubercles, short stripes along inner eye margin, and dorsal diamond-shaped mark black; pronotum and pronotal lobe dorsally reddish brown; pronotum with five black stripes: narrow median stripe and sublateral stripes and broad lateral stripes; pronotal lobe with narrow median stripe often not reaching posterior margin, with sublateral stripes interrupted at humeri and posteriorly not connected, with lateral stripes only anteriorly and faded; pronotum lateral of sublateral stripe yellowish; hind margin of pronotal lobe in some specimens bright yellow, in others reddish; proacetabula with blackish mark; thorax laterally yellowish to orange, ventrally lighter; mesopleura with broad black dorsal margin posteriorly connected with broad, black, ventrally faded mesopleural stripe, and with small black mark postero-ventrally; mes- and metacetabula with black marks nearly completely surrounding large yellow spots (Fig. 1); metanotum, tergite 1 and anterior part of tergite 2 orange, from tergite 2 to tergite 7 and all laterotergites deep black; forewing uniformly blackish; antennal segments 1 - 2 blackish brown, 3 - 4 whitish, with more or less distinctly infuscated base, in female sometimes more infuscated; coxae and trochanters yellowish, those of middle and hind legs dorsally with blackish marks; femora, tibiae, and

tarsi blackish; apices of meso- and metafemora and distal half of mesotibia whitish.

Structural characters. - Lengths of antennal segments 1 - 4 (of holotype; in mm) 4.7, 3.5, 4.8, 4.3; antenna of female shorter; segment 2 in male distinctly longer than width of head, in female subequal; lengths of leg segments (of holotype, in relation to length of mesofemur = 100 = 25.7 mm): profemur 33, protibia 31, protarsus 5+4, mesotibia 98, metatarsus 22+3, mesofemur 96, mesotibia 94, metatarsus 11+2; profemur of male without subapical indentation, more slender than mesofemur (0.9 times), with dense short pilosity on ventral surface; mesofemur distally with length of pilosity about one third of mesofemur width, in male in average longer, in female slightly shorter than body, in male subapically with a row of approximately 14 - 18 short spines and with one long tooth on inner surface (Fig. 3); metasternum without carina; sternites 2 - 7 with continuous median carina starting in proximal third of sternite 2; connexival spines in male distinctly diverging, in female pointing straight backwards, distance between their tips distinctly greater than their length.

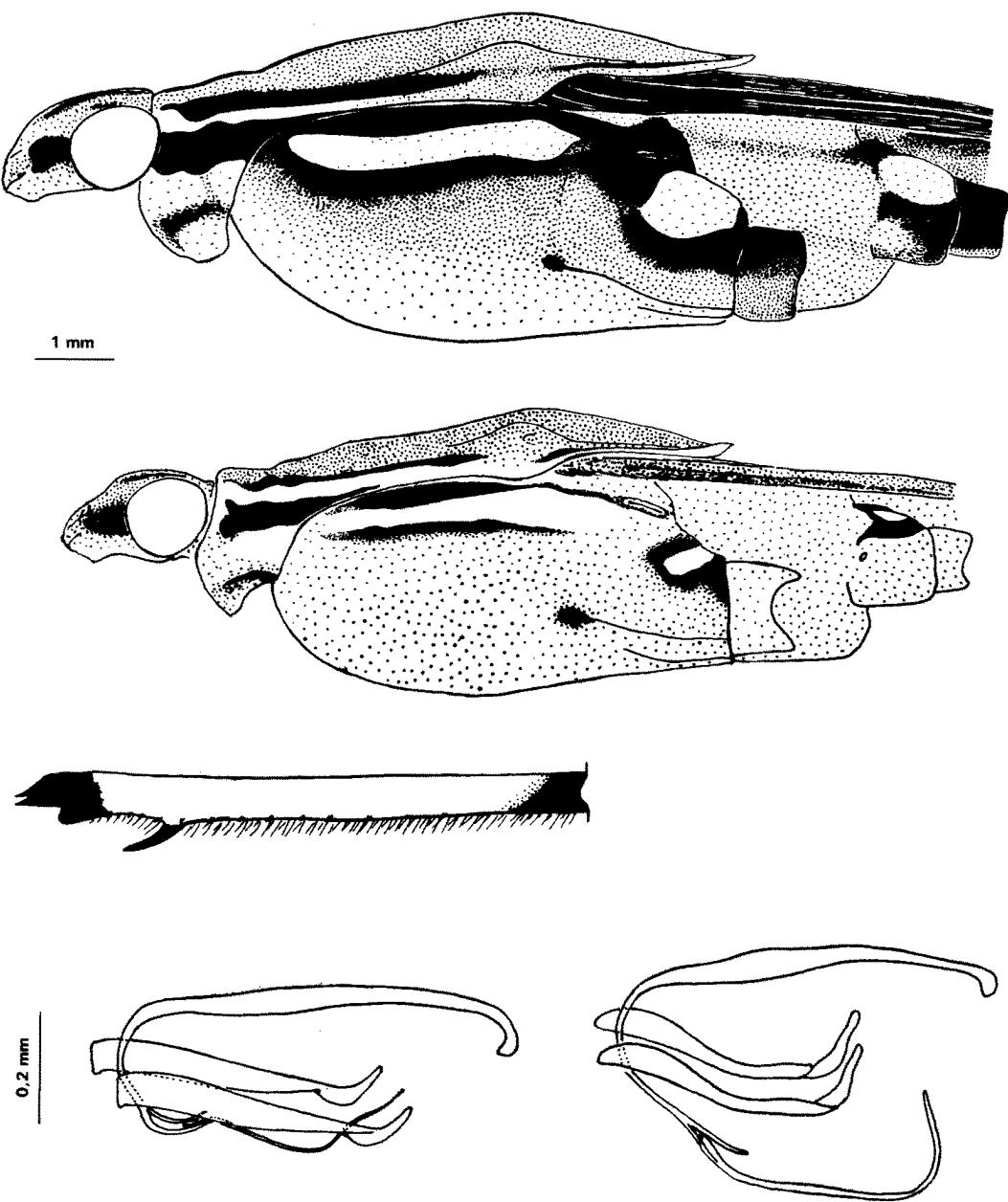
Male genitalia. - Segment 8 relatively small, distinctly depressed; pygophore simple; proctiger pointed; paramere elongate, straight; vesicula sclerites (Fig. 4) of diagnostic importance: dorsal sclerite proximally curved in a wide arch, medially slightly widened, apically hardly widened, indistinctly split into two very short, adjacent branches; lateral sclerite proximally wide, then evenly tapered, distally indistinctly hooked, nearly evenly curved.

Female terminalia: in lateral view, segment 7 ventrally with straight outline, posteriorly with weakly concave hind margin.

Diagnosis. - Large species with brownish red posterior lobe of pronotum, with black mesopleural stripe, with very large yellow dots on mes- and metacetabula, and with mesofemur of male bearing distinct anteapical spine, but no long hair fringe. Male vesicula sclerites (Fig. 4) diagnostic. Probably monomorphic macropterous.

Distribution. - West Malaysia, Sumatra, Java, Borneo.

Etymology. - *spinosis* (Latin, adjective) means "with spine," referring to the mesofemoral spine of the male.



Figs. 1-5. (1, 3, 4) *Limnometra spinosa*, new species, male, holotype; (2, 5) *L. femorata*, male; (1, 2) colour pattern of head and thorax, lateral view (2: modified after Zettel & Chen, 2000); (3) distal part of mesofemur; (4, 5) endosomal sclerites, "oblique" view.

ACKNOWLEDGEMENTS

My thanks are due to R. Brooks (Kansas University, U.S.A.), J. Deckert (Zoological Museum, Humboldt University, Berlin), H. Duffels (Zoological Museum Amsterdam), E. Heiss (Innsbruck), and M. Webb (The Natural History Museum, London) for the loan of

material used for this study; to U. Göllner-Scheiding (Zoological Museum, Humboldt University, Berlin) and H. Duffels for their kind hospitality during my visits in Berlin and Amsterdam, respectively; to C.W. Schaefer (Storrs, U.S.A.) for the correction of the English text; and to J.T. Polhemus (Englewood, U.S.A.) for remarks on the manuscript.

LITERATURE CITED

Andersen, N. M., 1995. Cladistics, historical biogeography, and a check list of gerrine water striders (Heteroptera, Gerridae). *Steenstrupia*, **21**: 93-123.

Andersen, N. M. & T. A. Weir, 1997. The Gerrine Water Striders of Australia (Hemiptera: Gerridae): Taxonomy, Distribution and Ecology. *Invertebrate Taxonomy*, **11**: 203-299.

Cheng, L. & C. H. Fernando, 1969. A taxonomic study of the Malayan Gerridae (Hemiptera: Heteroptera) with notes on their biology and distribution. *Oriental Insects*, **3**: 97-110.

Hungerford, H. B. & R. Matsuda, 1958. The *Tenagogonus* - *Limnometra* complex of the Gerridae. *Kansas University Science Bulletin*, **39**: 371-457.

Mayr, G. L. 1865. Diagnosen neuer Hemipteren II. *Verhandlungen der Zoologisch-Botanischen Gesellschaft in Wien*, **15**: 429-446.

Nieser, N. & P. P. Chen, 1992. Revision of *Limnometra* Mayr (Gerridae) in the Malay Archipelago. *Tijdschrift voor Entomologie*, **135**: 11-26.

Polhemus, D. A. & J. T. Polhemus, 1998 (1997). A review of the genus *Limnometra* Mayr in New Guinea, with the description of a very large new species. *Journal of the New York Entomological Society*, **105**: 24-39.

Zettel, H. & P. P. Chen, 2000. *Limnometra palawanensis* spec.nov. (Heteroptera: Gerridae), and a synopsis of the Philippine species of *Limnometra*. *Entomologische Berichten Amsterdam*, **60**(5): 73-83.